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(71) Applicant : **Black & Decker Inc.**
Drummond Plaza Office Park 1423 Kirkwood
Highway
Newark Delaware 19711 (US)

(72) Inventor : **Garuglieri, Andrea**
Via Eritrea 7 Fraz. Ravellino
I-22050 Colle Brianza Como (IT)

(74) Representative : **Wetters, Basil David Peter et**
al
Emhart Patents Department, Lyn House, 39,
The Parade
Oadby, Leicester LE2 5BB (GB)

(54) A locking device.

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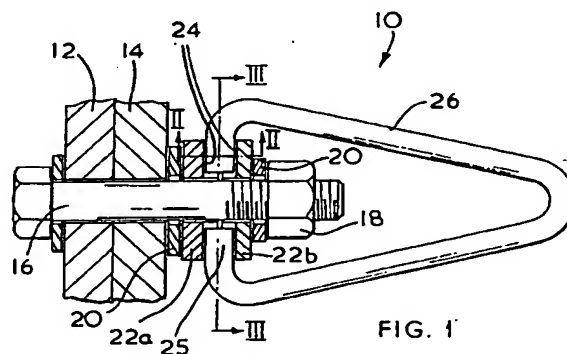


FIG. 1



European Patent
Office

EUROPEAN SEARCH REPORT

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EP 93 30 6683

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	US-A-2 430 677 (HOBART)	1-3	B23Q1/28
Y	* figure 1 *	11	F16B2/18
A	---	5, 10	B25B31/00
X	DE-A-29 43 919 (KESSEL)	1, 10	
A	* figures 1-3 *	3, 5, 7	
Y	DE-C-41 06 636 (BLACK & DECKER INC.)	11	
	* figure 10 *		
A	FR-A-1 586 785 (ETABS. CORBELETTA & CIE.)	1, 9	
	* figures 5-7 *		
A	EP-A-0 173 263 (FRIEDRICH DECKEL AG)	11	
	* claim 1 *		
A	DE-A-17 84 610 (MARTIN BEILHACK MASCHINENFABRIK UND HAMMERWERK GMBH)		
A	US-A-2 234 938 (DEGENER)		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.5) B23Q F16B B25B B25G
Place of search		Date of completion of the search	Examiner
THE HAGUE		15 December 1993	Carmichael, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			

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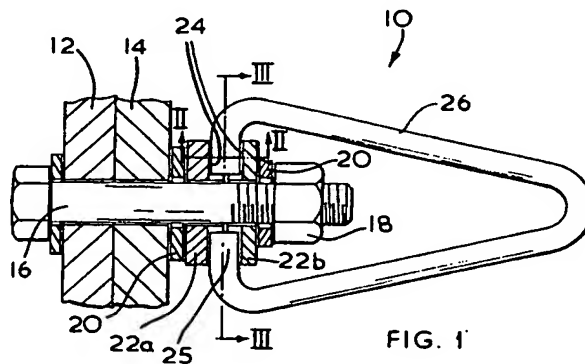
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This invention relates to locking devices for releasably holding two components together. A device of the sort described herein is particularly suitable for use in releasably holding a bevel block against a mounting block of a chop saw or the like.

Many devices are known for releasably holding two components together. The present invention aims to improve upon such prior art devices by providing a locking device which is simple to manufacture, easy to use and reliable.

With the foregoing in mind, the present invention provides a locking device for locking a first member to a second member when the first and second members are mounted on a pivot pin of the locking device, the locking device comprising a stop on the pivot pin, a lever providing at least one cam adjacent the pivot pin and a guide for retaining in position the or each cam, wherein the lever is movable between a locking position, in which the or each cam urges the second member towards the first member to prevent relative rotation therebetween, and a release position in which the second member is free to rotate about the pivot pin relative to the first member.

Preferably the stop is a nut on the pivot pin and the pivot pin is threaded to allow the position of the nut on the pin to be altered.

The pivot pin may be a bolt having a head which bears against the first member. Alternatively, the pivot pin may be formed integrally with the first member.

The guide preferably comprises two cam followers mounted on the pivot pin either side of the or each cam, each cam follower providing a groove for receiving a cam. Preferably the grooves are semi-circular, but other shapes may be used depending upon the shapes of the cams.

The guide may be attached to the stop, so that the stop rotates about the pivot pin in response to rotation of the lever.

Preferably a first washer separates the guide from the stop and a second washer separates the guide from the second member.

The or each cam is preferably elliptic in cross-section. Any other appropriate shape could, of course, also be used.

Preferably the lever is formed as a single length of metal terminating at its two ends with cams. The lever is preferably formed triangular in shape, the shortest of the three sides of the triangle being the side incorporating the cams. By having this shape, rotation of the lever about the shortest side of the triangle, to adjust the orientations of the cams, is facilitated.

Although a locking device as herein described could be used in many different applications, such a device is particularly suitable for use in a saw, such as a chop saw, wherein the first member is a mounting block and the second member is a bevel block. By using the locking device in such an application, an an-

gle for a bevel cut can be readily adjusted and held, simply by moving the lever to its release position, adjusting the angle of the bevel block relative to the mounting block and moving the lever back into its locking position.

A specific embodiment of the present invention is now described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a side section through a locking device according to the present invention;

Figure 2 is a section on the line II-II in Figure 1; and

Figure 3 is a section on the line III-III in Figure 1.

With reference to the drawings, a locking device 10 releasably secures two components 12, 14 together. The device 10 comprises a bolt 16 and a nut 18, which are adjustable using spanners. In an alternative embodiment of the present invention, the bolt 16 may be either formed integrally with the component 12 or captured by some means (not shown) to the component 12.

Two washers 20 and two cam followers 22a, 22b are captured between the nut 18 and the second component 14. Each cam follower 22a, 22b is washer-like but has facing, semi-circular grooves 24 arranged in a cruciform manner.

The grooves 24 of the two cam followers 22a, 22b together form a guide for receiving and retaining cams 25, which are formed at the ends of a lever 26. The ends (i.e. the cams 25), at least, of the lever 26 are elliptic in cross-section (see Figure 2).

In the position shown in Figure 1, in which the main part of the lever 26 (which is substantially triangular in shape) is in line with the bolt 16, the shortest dimension across the elliptic ends of the lever 26 are between the facing grooves 24. Consequently, the cam followers 22 and washers 20 are loose between the component 14 and the nut 18, thereby enabling the component 14 to rotate about the bolt 16 relative to the other component 12.

When the lever 26 is pivoted around the axis formed by its ends, the longer dimensions across the cams 25 of the lever 26 begin to press against the grooves 24, thereby prising the cam followers 22a, 22b apart. In so doing, the components 12, 14 are clamped tightly together to prevent relative rotation therebetween. Adjustment of the nut 18 permits a user to select the final position of the lever 26 with respect to the bolt 16 when the components 12, 14 are clamped together.

The washers 20 and cam followers 22 are freely rotatable on the bolt 16, so that the direction of pivoting of the lever 26 can be arranged as desired. In another embodiment of the locking device 10, however, the cam followers 22 could be rotationally locked to the nut 18 so that the nut 18 can be turned by turning the lever 26.

The cam followers 22a, 22b are formed from

slightly softer material than the cams 25 so that the majority of any wear which occurs between the cams and followers on repeated operation of the locking device is primarily felt by the grooves 24. After a time, they may become so worn that the device does function correctly. In this event it is simply a matter of changing the orientation of the followers 22a, 22b so that the other pair of grooves 24 is henceforth employed.

It will of course be understood that the present invention has been described above purely by way of example, and that modifications of detail can be made within the scope of the invention.

Claims

1. A locking device (10) for locking a first member (12) to a second member (14) when the first and second members (12, 14) are mounted on a pivot pin (16) of the locking device (10), the locking device (10) being characterised by a stop (18) on the pivot pin (16), a lever (26) providing at least one cam (25) adjacent the pivot pin (16) and a guide (24) for retaining in position the or each cam (25), wherein the lever (26) is movable between a locking position, in which the or each cam (25) urges the second member (14) towards the first member (12) to prevent relative rotation therebetween, and a release position in which the second member (14) is free to rotate about the pivot pin (16) relative to the first member (12).
2. A locking device according to Claim 1, characterised in that the stop (18) is a nut on the pivot pin (16) and the pivot pin is threaded to allow the position of the nut (18) on the pin to be altered.
3. A locking device according to Claim 1 or Claim 2, characterised in that the pivot pin (16) is a bolt having a head which bears against the first member.
4. A locking device according to Claim 1 or Claim 2, characterised in that the pivot pin (16) is formed integrally with the first member (12).
5. A locking device according to any preceding claim, characterised in that the guide comprises two cam followers (22a, 22b) mounted on the pivot pin (16) either side of the or each cam (25), each cam follower (22a, 22b) providing a groove (24) for receiving a cam (25).
6. A locking device according to Claim 5, characterised in that the grooves (24) are semi-circular.
7. A locking device according to any preceding

claim, characterised in that the guide (24) is attached to the stop (18) such that the stop (18) rotates about the pivot pin (16) in response to rotation of the lever (26).

8. A locking device according to any preceding claim, characterised in that a first washer (20) separates the guide (24) from the stop (18) and a second washer (20) separates the guide (24) from the second member (14).
9. A locking device according to any preceding claim, characterised in that the or each cam (25) is elliptic in cross-section.
10. A locking device according to any preceding claim, characterised in that the lever (26) is formed as a single length of metal terminating at its ends with two cams (25).
11. A saw incorporating a locking device according to any preceding claim, characterised in that the first member (21) is a mounting block and the second member (14) is a bevel block.

